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ABSTRACT

The purpose of this longitudinal project was to determine the influence of the family upon the early development and implementation of a gifted child's talent. Researchers examined two samples of exceptionally gifted boys and their families. One sample had cognitive scores within the 99th percentile in the mathematics-science domain; the other had IQ's over 150. The study was based on the following set of postulates: (1) creativity and intelligence share a number of attributes and perform in similar ways within a person's interactions with his environment; (2) the gifted person must undergo several developmental transformations that change their early giftedness into appropriate dispositions; (3) these transformations begin within the family but become refined by formal and informal education; (4) the family directs a child's early giftedness into progressively more suitable interests; (5) giftedness has a developmental history of its own. Results demonstrated statistical support for the association between the measures of creative potential and creative performance; moreover, the high IQ sample had creativity scored more closely tied to family variables that the math-science group. Researchers concluded that different types of cognitive exceptionality relate to different patterns of family experiences as conveyed by measn of their parents' personality traits. (RB)

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Personality and Family Variables and Exceptionally Gifted Boys' Creative Potential

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Introduction

The basic objective of this longitudinal project is to determine the influence of the family upon the early development and subsequent implementation of the gifted child's talent. More specifically, we are investigating two samples of exceptionally gifted boys and their families. By exceptionally gifted we mean having cognitive scores within the 99th percentile either in the math-science domain or the IQ (IQ < 150).

Since Galton's Hereditary Genius (1869), there have been two basic assumptions regarding an individual's attainment of eminence. First is the notion that the eminent individual is unusually talented and cognitively gifted (Chauncey & Hilton, 1983; Cox, 1926; Galton, 1869; MacKinnon, 1978; Roe et al., 1983; Wallach et al., 1978). There are, however, numerous others who hold reservations regarding the contribution of IQ to either creativeness or eminence (Barron, 1969; Wallach, 1983). It appears to us that in most professions there must be some specific talent as a necessary if not sufficient factor in the achievement of eminence. We have taken a conservative view, in line with Chauncey and Hilton, Cox, Roe and Walberg, and restricted our sample to subjects who are psychometrically exceptionally gifted. Moreover, because there is more evidence (and until recent years more interest) regarding eminent males, we have restricted our samples to boys.

The second basic assumption has to do with the role of family variables in an individual's attainment of eminence. From the start, the influence of the family has been explained as essential, and either hereditary (e.g., Galton) or experiental (e.g., Freud). With the groundwork of Galton and Freud, and other more recent and relatively clear evidence, the family does appear to influence early cognitive development through both its genetics and its non-cognitive emphases (e.g., values, educational opportunities, aspirations, and in some cases, through disturbances and conflicts). All else being equal, the family variables can make the difference between a fulfilled promise and dismal failure. The careers of Weiner and Sidis, childhood friends, are good examples of this need. Thus, we are assuming throughout this project that the attainment of eminence involves the gifted child's family, especially through the first two decades. Outside of the work of psychoanalysis, the dynamic and historical nature of families is not well understood. However, we can say that families have an active, systematic history, with many of the parents' motivations and values regarding their children coming from the parents' own development and experience. We do not ignore the influence of both formal and informal education, or early career opportunities (Busse & Mansfield, 1981). Still, we presume that the pre-eminent set of variables in the attainment of eminence are family-related; and that they are intergenerational (involving the child, parents,

and grandparents), often being explicit behaviors deliberately guided toward the enhancement and maximization of the indivdual's talents and gifts (Albert, 1978; Bloom, 1985).

Giftedness, like any exceptionality, is an organizer. It focuses and mobilizes much of the interest, attention, and interactions within the gifted child's social enivronment, and it "directs" the development of the gifted individual. Further, Giftedness, like the family, is experience-producing and experience-selecting. And because they function alike, families and giftedness often become aligned with one another. But only where the fit between them is moderately close, syntonic and realistic, is development favorable for a significant eminent career.

With the above assumptions in mind, we have developed a set of postulates for our longitudinal study. The main ones are as follows.

(1) Even though most psychometric evidence argues for a threshold hypothesis (Runco & Albert, 1985; Sternberg, 1982) requiring high levels of IQ and talent, we believe that it is not necessary to completely separate intelligence and creativity (Albert & Runco, 1985). They share a number of attributes and perform in similar ways within the individual's interactions with the chosen performance environment. Each component--intelligence and creative ability--is necessary for eminence; neither alone leads to much.

(2) In order for a gifted person to achieve a recognizably high level of eminence, there must be several developmental transformations of their early giftedness into a set of appropriate dispositions (i.e., personality traits, values, achievement drives, and selective cognitive skills or abilities) permitting him or her to engage in highly important and unusual work within a specific career (Busse & Mansfield, 1984; Merrifield, 1964; Ruston, Murray, & Paunomen, 1983). Put simply, one attains eminence only by using their gifts, and influencing and impressing persons in a position to understand, judge, and appreciate the effort and results (Albert, 1975; Zuckerman, 1977).

(3) The transformations begin initially within one's family, but become steadily refined, directed, and interrelated in one's formal and informal education, well into one's early career efforts (Barber, 1985; Roe, 1952; Zuckerman, 1977). It is important to note that these transformations are more clearly tracked in art, mathematics, and the biological and physical sciences than in the non-sciences and other less cognitively structured and rule-bound fields (e.g., business, teaching). The family initiates the process, but it takes a great deal of sustained learning in the overlapping contexts of family, school, and career for a highly gifted young person to be in a position to achieve eminence (Busse & Mansfield, 1981; Chambers, 1964; Roe, 1952; Simonton, 1984). Without appropriate long-term effort

and training within these informing contexts, it is likely that even the highest giftedness will either become tangential or lie fallow and remain relatively unproductive. The critical stimulation is initially directed--usually deliberately--by significant family members, intrafamily experiences and values, and the young person's significant teachers and mentors offering educational and career opportunities (Chambers, 1964; Zuckerman, 1977). In these opportunities, the gifted person acquires the necessary personality dispositions, skills, and values, and realistically tests their relevance to their (and the family's) aspirations. Put simply, there must be a goodness-of-fit between him or her and the chosen career.

(4) For this reason we speak of the family and one's early career choices as experience-producing and experience-selecting agents in the continuous development of one's giftedness. They both demand and generate specific skills and drives (Albert, 1978, 1980) and canalize a child's early giftedness, development, and efforts into progressively better fitting abilities, styles, and interests. The earliest example of this process is what Bowen (1977) termed "interactional synchrony" between an infant and parents.

(5) A family's experience-producing and experience-selecting attributes reside mainly in its key members' socioeconomic status, personalities, and central values, and this implies that parents and children have simultaneous motivating and canalizing

consequences (Bloom, 1985; Yarrow & Peterson, 1976). Exceptionally giftedness itself is experience-producing and experience-selecting, and this can motivate the individual and act as a second source for the developmental transformation leadings to a goodness-of-fit between development and career targets. Thus giftedness has a developmental history of its own and is not open to random or non-specific interventions.

Our empirical research has been an attempt to test this model, and to overcome what we believe are the four primary problems in previous research. These problems include, first, distinguishing among the different types of early giftedness and talents which may be the underpinning to later achievements (Gardner, 1981). Second is the problem of looking at the influence of "the family" as a global category. In a study of the antecedents to the achievement of eminence, there is a critical need to be very specific as to the factors, the persons, the processes, and the types of interactions one is referring to as the family. A third problem lies in the direction and timing of investigation. Is it longitudinal, cross-sectional, or retrospective? Because eminence is a developmental outcome of many processes and relationships, to understand their possible combinations and influences at different points of development, one must use a longitudinal design to ensure observations of their presence and impact (as well as their disappearences--the so-called U shape phenomenon). Only some variables and

experiences are facilitative; others may inhibit or may not influence the development of a gifted child. Finally, there are degrees of eminence ranging from the somewhat "effective individual" to the world-class creator. Thus, the fourth problem is to operationalize the level of attainment (Albert, 1984). Without these efforts the investigator loses important information and the power to determine which are the critical predictors, their relationships to one another, and their possible influences.

Method

Subjects

There are two samples in this study; and the basic observational and analytical unit is the son and his parents. One (n = 26) is a group of exceptionally gifted Math-Science boys who were between 12 and 13 years of age when we first contacted them. They were among the top 40 in the 1976 SMPY sample. This ranking was based on a composite score of the SAT and other standard measures of mathematical and science aptitudes (Stanley, George, & Solano, 1977). Their mean SAT math score was 635, and the mean SAT verbal score was 492. The families averaged 2.5 children and were in the upper-middle socioeconomic class. The second sample (n = 28) cinsisted of the same age boys and their parents. They were selected on the basis of IQs above 150. The mean IQ was 155 (sd = 6.8). These families have an average of 2.3 children and also were in the upper-middle class.

Instruments

Our measures of cognitive giftedness (the SAT and the IQ) have performance characteristics that are different from those involved in creativity (Sternberg, 1982), or required for the attainment of eminence (Nicholls, 1983). They are, however, predictive of academic performance (Stanley, 1978) and, to a certain degree, of real-life achievement (Chauncey & Hilton, 1983). Our other predictors are the California Personality Inventory (CPI), the Loevinger Sentence Completion Test, the Majoribanks Family Environment Inventory, the Allport-Vernon-Lindzy Study of Values, the Holland Vocational Performance Inventory, and lengthy individual and family interviews. Preliminary criterion measures include the Biographical Inventory of Creativity (BIC) and the Wallach-Kogan Divergent Thinking (DT) Test battery; and the ultimate criterion is the eventual degree of achieved eminence as measured by awards, citations, honors, and the like.

Results

In this presentation we shall report specifically the analyses of the Majoribanks Family Environment Inventory scores, parents' and sons' CPIs, and sons' creative potential (as measured by the BIC and the DT test battery). Table 1 presents the interitem correlation coefficients (alpha) and representative items for each "press" of the Majoribanks Family Environment Inventory. It is clear that each is highly reliable, with alpha

coefficients ranging between .594 to .878, and a mean of .759.

Table 2 presents the intercorrelations of cognitive test scores. Note here that the samples are quite different from one another. The scores of the Math-Science sample are statistical independent, whereas those of the Exceptionally High IQ sample are significantly associated with one another. This independence among the various measures is characteristic of the Math-Science sample, as is the significant correlation among scores of the Exceptionally High IQ sample.

Table 3 presents the means and standard deviations for the Family Environment presses for each sample. The means indicate that the Exceptionally High IQ families "press" significantly more for Activity, ~~Independence~~, and Father- and Mother-Involvement, whereas the Math-Science families "press" more for their sons' Independence, Achievement and Intellectuality. A MANOVA indicated that the two groups are significantly different in the multivariate test ($\underline{R}c = .58$, $\underline{F}(6, 45) = 3.83$, $\underline{p} < .01$), and four of the univariate tests (see Table 3).

Canonical correlational analyses were also conducted using Enivronment Presses as one set of variables and sons' creativity scores as the other set. The IQ sample's presses were significantly related to the creativity scores in the multivariate test ($\underline{R}c = .79$, $\underline{F}(24, 64) = 1.90$, $\underline{p} < .05$) whereas the Math-Science sample's was not. Similarly, regression analyses indicate that the presses were related to the IQ

sample's verbal and figural divergent thinking test scores (R = .76 and .69, respectively, $F(6, 21) = 4.72$ and 3.20, $p < .01$ and .05). No significant relationships were found for the Math-Science sample.

CPI results are presented in Tables 4, 5 and 6. Most important here is the similarity among the families in the High IQ sample. These are consistent with the earlier findings. A discriminant analysis was also conducted to determine the best pattern of CPI scales to maximally distinguish between the high and low (median split) creative individual within the two samples. These results are presented in Table 6.

Insert Tables 4, 5, and 6 about here

Conclusion

Our original postulate was that the two types of cognitive giftedness, although of a comparable level of exceptionality, differentially organize important family variables and in turn are organized by the different family environments. The family variables used here were parents' CPI personality traits and the "presses" for Achievement, Activity, Intellectuality, Independence, and Father- and Mother-Involvement. We found strong statistical support for the association between the dependent measures of creative potential (the BIC), creative performance (the Wallach-Kogan DT tests), and our independent

measures of parental personality and family variables. The associations are themselves important; but it is also important to recognize that the two samples had different patterns of predictor variables. Looking at the pattern of means on the Environmental Presses, for example, significant group differences are quite apparent. The Exceptionally High IQ sample seems to press more for family interaction (e.g., Mother- and Father-Involvement) than the Math-Science sample; and the Math-Science sample presses more for Independence and intellectual achievement (e.g., Intellectuality, Achievement). Also, the High IQ sample had creativity scores that were more closely tied to the family variables than the Math-Science group. Furthermore, the Math-Science group seemed to have more specialized skills, as reflected in the independence of the dependent measures' intercorrelations. These fingings are highly all consistent with our earlier results (e.g., Albert, 1971, 1978, 1980a, 1980b; Albert & Runco, in press; Runco & Albert, 1985), and it appears that different types of cognitive exceptionality relate to different patterns of family experiences as these are conveyed by means of their parents' personality traits and their family presses. By age 12-13 these exceptionally gifted boys are on two significantly different developmental and personality tracks, each relating differently to their family and social environments.

Research in progress is evaluating the role of independence-training in these families, as well as sample

differences in autonomy. Additionally, we are looking at the children's evaluations of their families, schools, and learning environments. And ultimately, at the end of our longitudinal project, each of our measures will be tested as predictors of real-world accomplishment.

Table 1

The Environmental Presses, the Number of Questionnaire Items per Press, the Reliability Coefficents (alpha), and Exemplary Items

Achievement Press (n = 24) alpha = .786

examples:
(1) How much education do you expect your son to receive?
(2) What grades do you expect him to receive in school?
(3) What kind of job would you like your son to have when he grows up?

Activity Press (n = 8) alpha = .863

examples:
(1) Does your son take any lessons outside of school (e.g., music, art, sports, language)?
(2) How many hours does your son spend watching TV each weekend?
(3) How many books does your son bring home from the library each month?

Intellectuality Press (n = 15) alpha = .719

examples:
(1) How particular are you about your sons vocabulary and grammar?
(2) How much time do you expect your son to spend on homework each day (outside of school-time)?
(3) How many magazines or journals do you have delivered to your home each month?

Independence Press (n = 29) alpha = .878

examples:
(1) How often do you give your boy an article from the newspaper or magazine to read?
(2) How often do you initiate one of your son's hobbies or activities?
(3) How often do you discuss a TV program with your son?

Mother and Father Presses (each n = 8) alpha = .594 and .714

examples:
(1) How many outside activities (recreational) have you and your son shared in the past six months?
(2) How often do you praise or congratulate your son?
(3) Have you taken any courses (outside of the home) in the past 2 or 3 years?

Table 2

Intercorrelations of the Art-Writing (AW) and Math-Science (MS) Scales of the Biographical Inventory of Creativity (BIC), Divergent Thinking (DT), and Cognitive Ability Scores

	Math-Science (n = 26)		
	BIC_{AW}	BIC_{MS}	Math-Science Scores
BIC_{AW}	1.000		.243
BIC_{MS}	.202	1.00	.290
DT Total	.104	-.194	.027

	Exceptionally High IQ (n = 28)		
	BIC_{AW}	BIC_{MS}	IQ
BIC_{AW}	1.00		-.078
BIC_{MS}	.690***	1.00	.127
DT Total	.443**	.389*	.347*

*$p < .05$ (one-tail)

**$p < .01$

***$p < .001$

Table 3

Means, Standard Deviations, and Group Differences

on the Majoribanks Family Environment Inventory Presses

	Math-Science Families (n = 26)		Exceptionally High IQ Families (n=28)	
Press	mean	sd	mean	sd
Achievement	3.76	.39	3.61	.69
Activity	1.93**	.56	2.45**	.71
Intellectuality	2.88	.36	2.77	.48
Independence	1.36*	.80	1.77*	.75
Father-Involvement	1.30*	.42	1.59*	.55
Mother-Involvement	1.20**	.34	1.51**	.43

*$p < .05$

**$p < .01$

Table 4

California Psychological Inventory Means and Standard Deviations for Subjects and Parents

CPI Scale	Subjects		Mothers		Fathers	
	Math-Gifted (n=26)	High IQ (n=28)	Math-Gifted (n=26)	High IQ (n=28)	Math-Gifted (n=23)	High IQ (n=26)
Dominance (Do)	25.3(7.0)	28.2(5.6)	28.6(6.7)	31.7(5.8)	31.5(6.2)	30.5(5.8)
Capacity for Status (Cs)	16.0(4.4)	16.9(4.2)	21.3(3.5)	22.9(3.1)	21.4(2.9)	21.5(4.4)
Sociability (Sy)	22.2(5.7)	25.2(5.4)	24.5(5.7)	27.0(4.8)	25.0(3.7)	24.7(5.0)
Social Presence (Sp)	32.5(6.1)	36.6(6.8)	34.7(4.4)	37.3(6.3)	35.6(4.4)	36.6(6.9)
Self-Acceptance (Sa)	20.6(3.4)	22.3(3.8)	20.2(3.5)	23.5(3.9)	22.2(3.4)	22.6(4.7)
Well-being (Wb)	28.1(6.9)	29.6(5.5)	36.1(4.3)	38.0(2.7)	37.8(3.7)	36.7(4.9)
Responsibility (Re)	27.6(5.7)	26.1(5.5)	32.9(5.5)	33.4(3.3)	33.1(4.2)	29.6(5.0)
Socialization (So)	37.0(6.2)	36.3(5.6)	38.4(5.6)	38.5(4.7)	38.6(5.0)	36.2(5.1)
Self-Control (Sc)	21.6(8.0)	20.9(8.5)	32.2(5.9)	31.5(5.8)	33.0(6.4)	30.7(6.5)
Tolerance (To)	18.8(5.7)	18.3(5.7)	24.4(5.1)	25.3(2.5)	25.0(3.4)	22.9(4.2)
Good Impression (Gi)	10.3(5.1)	11.7(5.6)	16.7(4.8)	17.9(5.1)	19.0(6.2)	17.8(5.0)
Communality (Cm)	24.2(3.3)	25.0(2.1)	26.2(1.8)	25.8(1.7)	25.7(1.4)	26.0(1.4)
Achiev.-Conformance (Ac)	23.0(4.6)	28.7(4.5)	28.7(4.5)	30.6(3.3)	30.1(3.3)	30.0(3.4)
Achiev.-Independence (Ai)	18.8(3.6)	18.1(4.7)	24.2(4.4)	23.7(2.9)	24.2(3.3)	22.8(4.0)
Intellectual-Efficiency (Ie)	34.3(6.2)	36.3(5.1)	39.9(5.1)	42.6(2.4)	42.7(4.2)	40.7(4.0)
Psychological-Mindedness (Py)	10.3(2.8)	10.6(2.9)	12.7(3.0)	12.5(2.3)	13.3(3.1)	16.0(3.2)
Flexibility (Fx)	11.7(3.5)	10.9(3.9)	11.2(4.1)	11.0(4.5)	10.6(5.3)	11.5(3.4)
Femininity (Fe)	18.9(3.5)	18.3(3.9)	24.3(3.5)	24.4(2.5)	17.7(2.7)	16.7(3.8)

Table 5

Family CPI Similarity[a] for Both Samples of Gifted Boys and Their Parents

	Mathematical-Science (n=23)		Exceptionally High IQ (n=26)	
CPI Scale	mean	sd	mean	sd
Dominance (Do)	8.26*	3.57	5.97*	2.92
Capacity for Status (Cs)	5.45	2.56	4.97	2.50
Sociability (Sy)	5.65*	3.86	4.03*	2.50
Social Presence (Sp)	5.51	2.98	6.08	2.77
Self-Acceptance (Sa)	4.03	1.79	4.18	2.40
Well-being (Wb)	7.71	4.26	6.97	3.86
Responsibility (Re)	5.00*	3.00	6.62*	2.13
Socialization (So)	4.81	3.98	5.74	2.26
Self-Control (Sc)	10.32	4.07	9.44	4.79
Tolerance (To)	6.20	2.48	6.21	3.98
Good Impression (Gi)	7.65*	3.13	6.26*	3.07
Communality (Cm)	2.38	1.92	1.80	1.67
Achiev.-Conformance (Ac)	6.30	2.86	5.69	3.20
Achiev.-Independence (Ai)	4.74*	2.14	6.08*	3.40
Intellectual-Efficiency (Ie)	7.04	3.62	6.30	4.80
Psychological-Mindedness (Py)	3.39	1.59	3.44	1.73
Flexibility (Fx)	4.87	1.52	4.51	2.35
Femininity (Fe)	5.71	2.83	6.33	2.96

[a]the lower the mean score, the greater the similarity among family members.

*Statistically significant differences between the two samples.